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FIG. 1

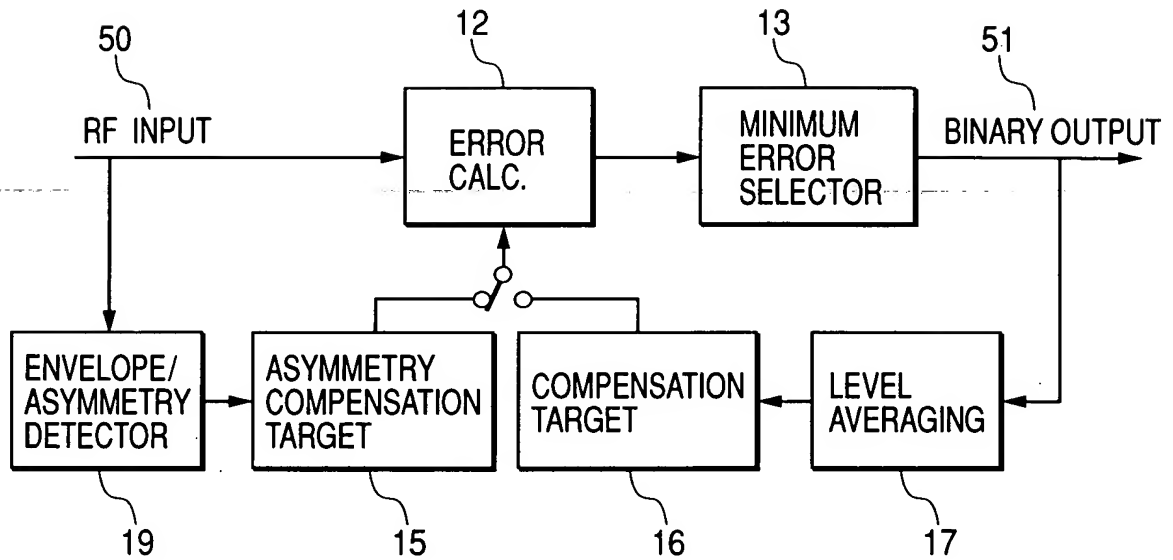
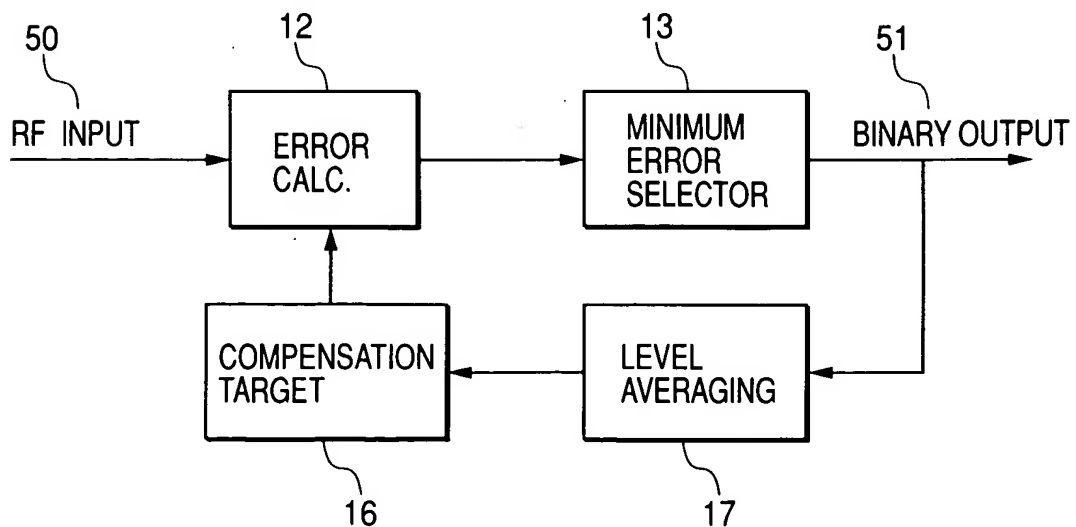
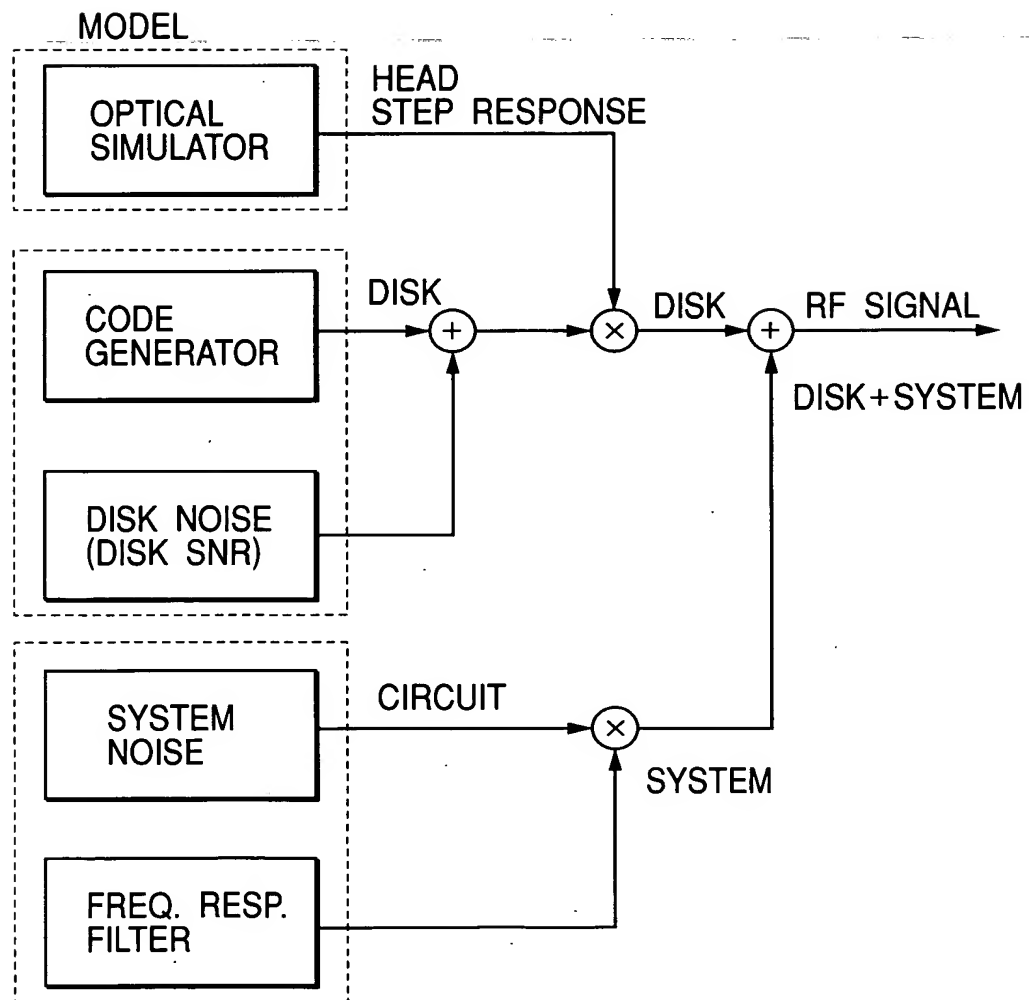


FIG. 2



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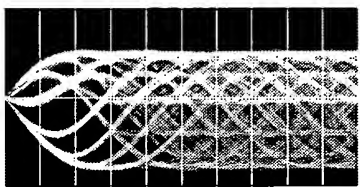
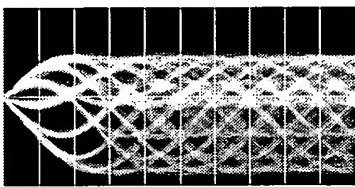
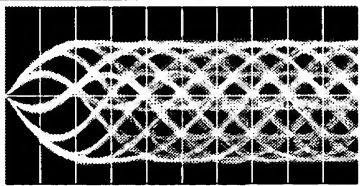
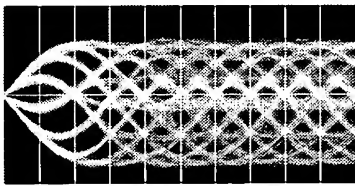
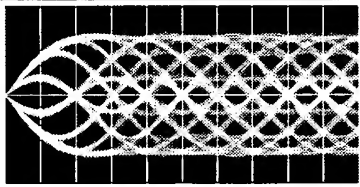
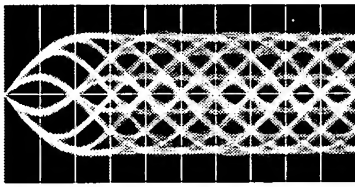
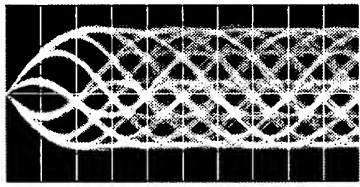
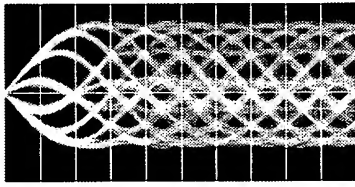
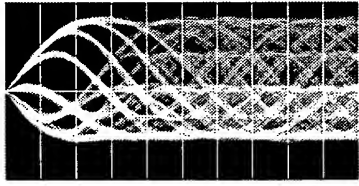
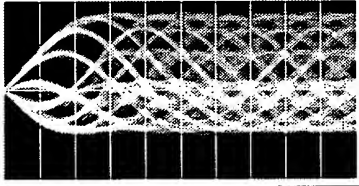
FIG. 3



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FIG. 4

SIGNALS OF RLL(1,7)

Δ MARK	ASYMMETRY	HPF SIGNAL	DFB SIGNAL
-0.8Tw	-20%		
-0.4Tw	-10%		
± 0 Tw	0%		
+0.4Tw	+10%		
+0.8Tw	+20%		

SIMULATION CONDITION

WAVELENGTH = 405nm

NUMERICAL APERTURE = 0.85

Tw = 75nm

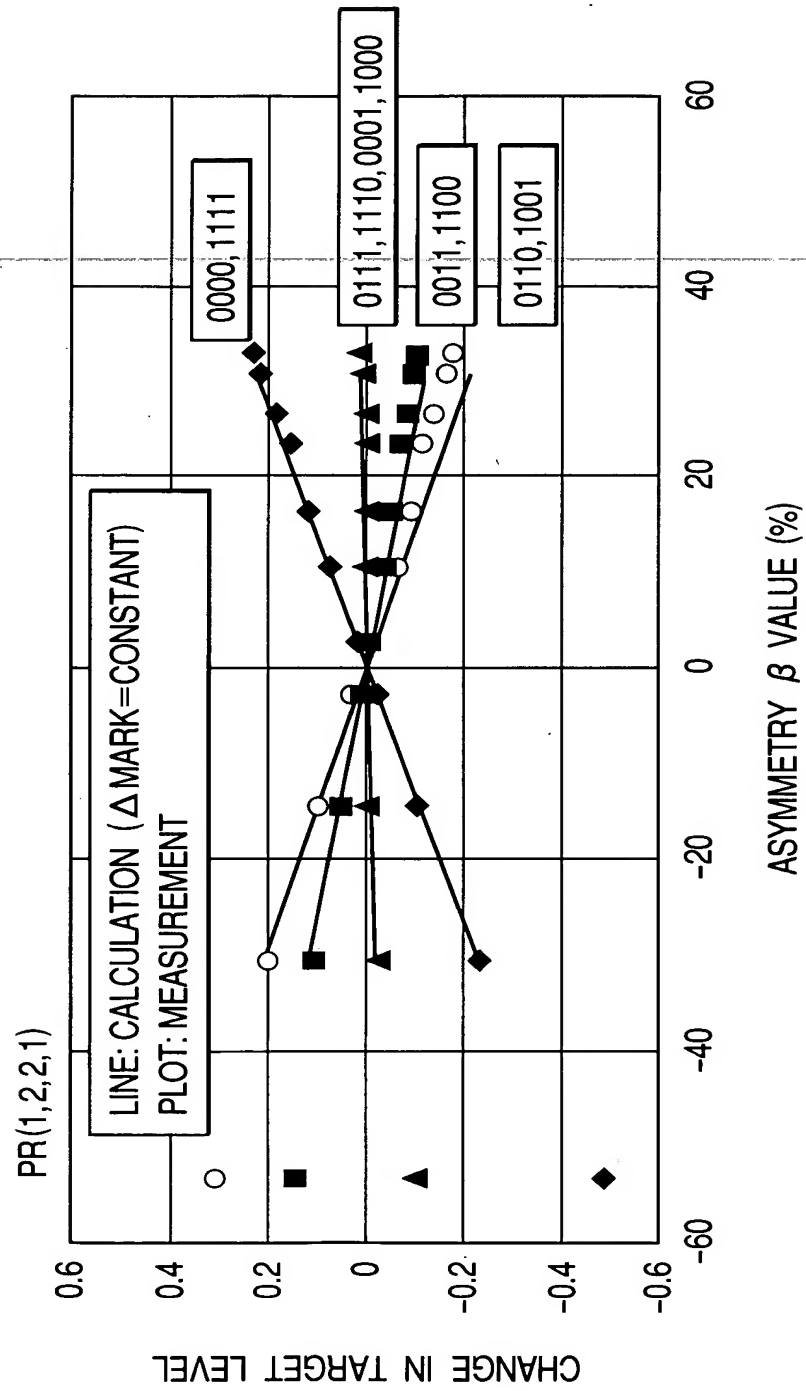
MODULATION CODE = RLL(1,7)

PRCLASS = PR(1,2,2,1)

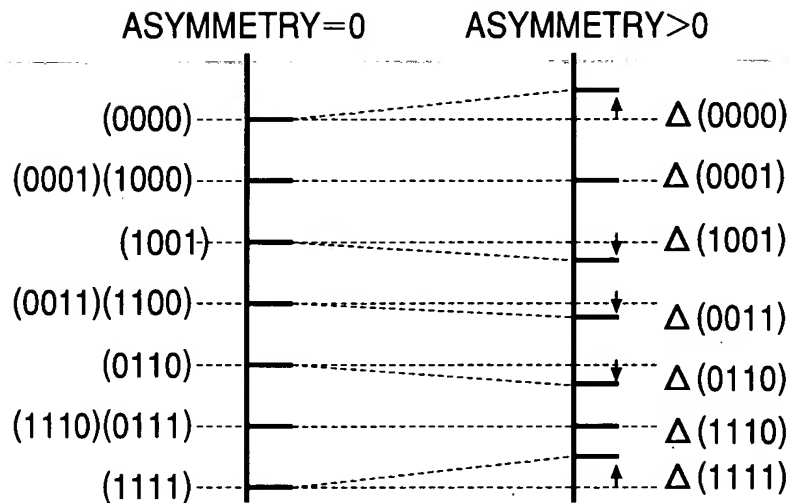
EQ = 11TAP(OPTIMIZED BY LSE METHOD)

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FIG. 5



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FIG. 6**RULE OF ASYMMETRY FOR THE BLUE LD DISKS**

(1) FOLLOWING FOUR LEVELS CAN BE REPRESENTED ALL 10 BIT ARRAYS

$$\Delta 4 = (\Delta(0000) + \Delta(1111)) / 2$$

$$\Delta 3 = (\Delta(0001) + \Delta(1000) + \Delta(1110) + \Delta(0111)) / 4$$

$$\Delta 2 = (\Delta(1001) + \Delta(0110)) / 2$$

$$\Delta E = (\Delta(0011) + \Delta(1100)) / 2$$

(2) FOLLOWING PROPORTIONAL RELATIONSHIP IS FOUND

$$\Delta 4 : \Delta 3 : \Delta 2 : \Delta E = 1 : 0.05 : -0.91 : 0.52$$

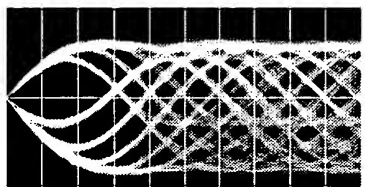
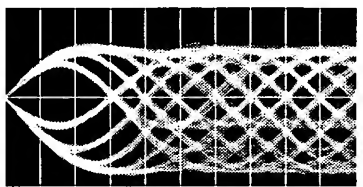
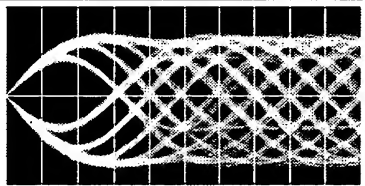
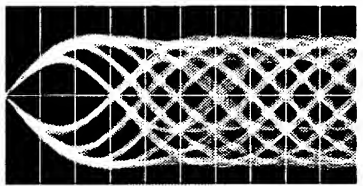
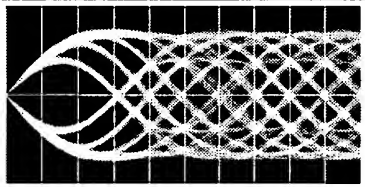
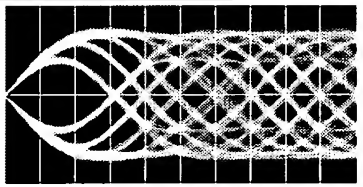
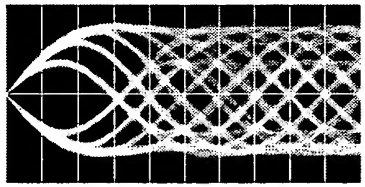
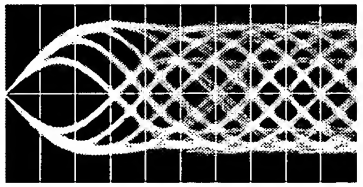
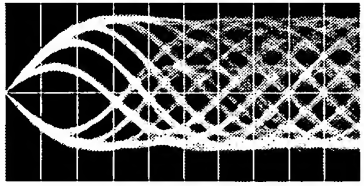
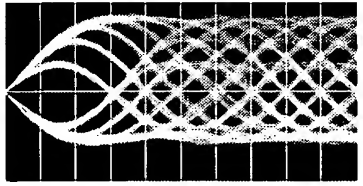
SUMMARY:

BY USING THE ENVELOPE LEVELS OF READOUT SIGNAL ($\Delta 4$) OR ASYMMETRY, THE OPTIMUM TARGET LEVELS FOR PRML DETECTION CAN BE DEFINED

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FIG. 7

SIGNALS OF RLL(2,10)

Δ MARK	ASYMMETRY	HPF SIGNAL	DFB SIGNAL
$-0.8T_w$	-14%		
$-0.4T_w$	-7%		
$\pm 0T_w$	0%		
$+0.4T_w$	+7%		
$+0.8T_w$	+14%		

SIMULATION CONDITION

WAVELENGTH = 650nm

NUMERICAL APERTURE = 0.60

 $T_w = 133\text{nm}$

MODULATION CODE = RLL(2,7)

PRCLASS = PR(3,4,4,3)

EQ = 11TAP(OPTIMIZED BY LSE METHOD)

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FIG. 8

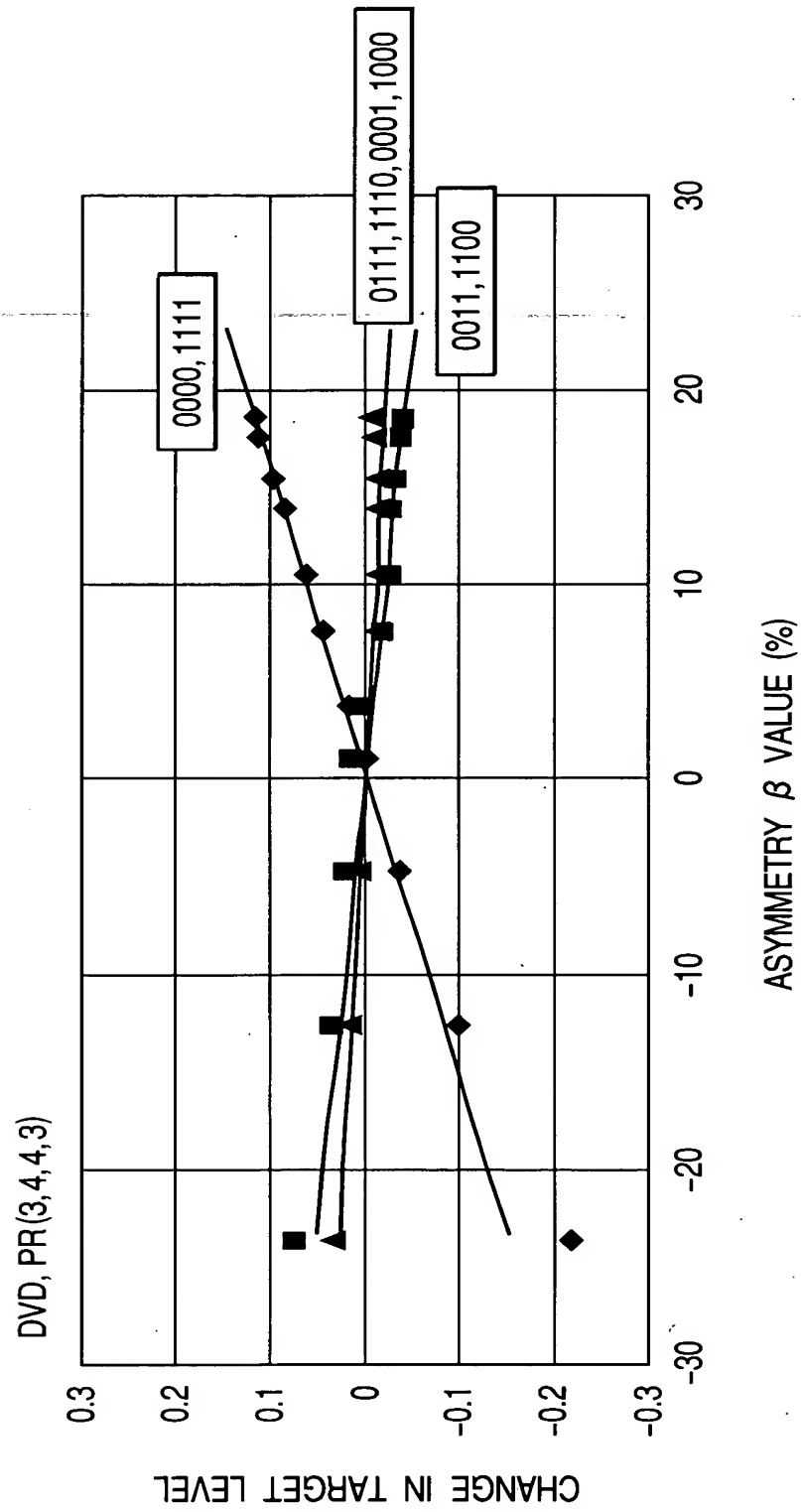
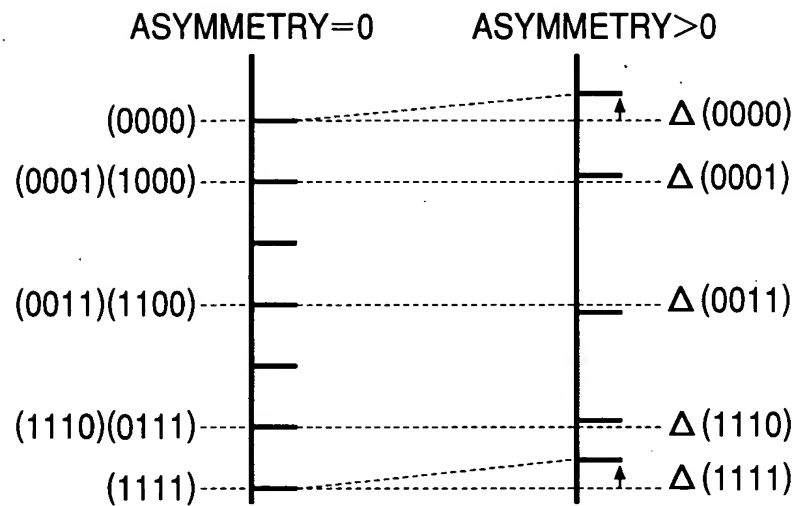


FIG. 9



RULE OF ASYMMETRY FOR DVD

(1) FOLLOWING THREE LEVELS CAN BE REPRESENTED ALL 8 BIT ARRAYS

$$\Delta 4 = (\Delta(0000) + \Delta(1111)) / 2$$

$$\Delta 3 = (\Delta(0001) + \Delta(1000) + \Delta(1110) + \Delta(0111)) / 4$$

$$\Delta E = (\Delta(0011) + \Delta(1100)) / 2$$

(2) FOLLOWING PROPORTIONAL RELATIONSHIP IS FOUND

$$\Delta 4 : \Delta 3 : \Delta E = 1 : -0.15 : -0.31$$

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FIG. 10

MODULATION CODE	PR CLASS (*)	HPF ONLY (**)	DFB (DUTY FEEDBACK) (**) SLICE CONTROL
RLL (1,7) BD	PR (1,2,2,1)	$\Delta 4: \Delta 3: \Delta 2: \Delta E =$ $1:0.05:-0.91:0.52$ $\Delta 4=0.009 \alpha$ OR $\Delta 4=0.007 \beta$	$\Delta 4: \Delta 3: \Delta 2: \Delta E =$ $1:0.36:-0.29:-0.04$ $\Delta 4=0.015 \alpha$ OR $\Delta 4=0.011 \beta$
RLL (2,10) DVD	PR (3,4,4,3)	$\Delta 4: \Delta 3: \Delta E =$ $1:-0.15:-0.31$ $\Delta 4=0.0087 \alpha$ OR $\Delta 4=0.0064 \beta$	$\Delta 4: \Delta 3: \Delta E =$ $1:0.11:-0.01$ $\Delta 4=0.010 \alpha$ OR $\Delta 4=0.008 \beta$

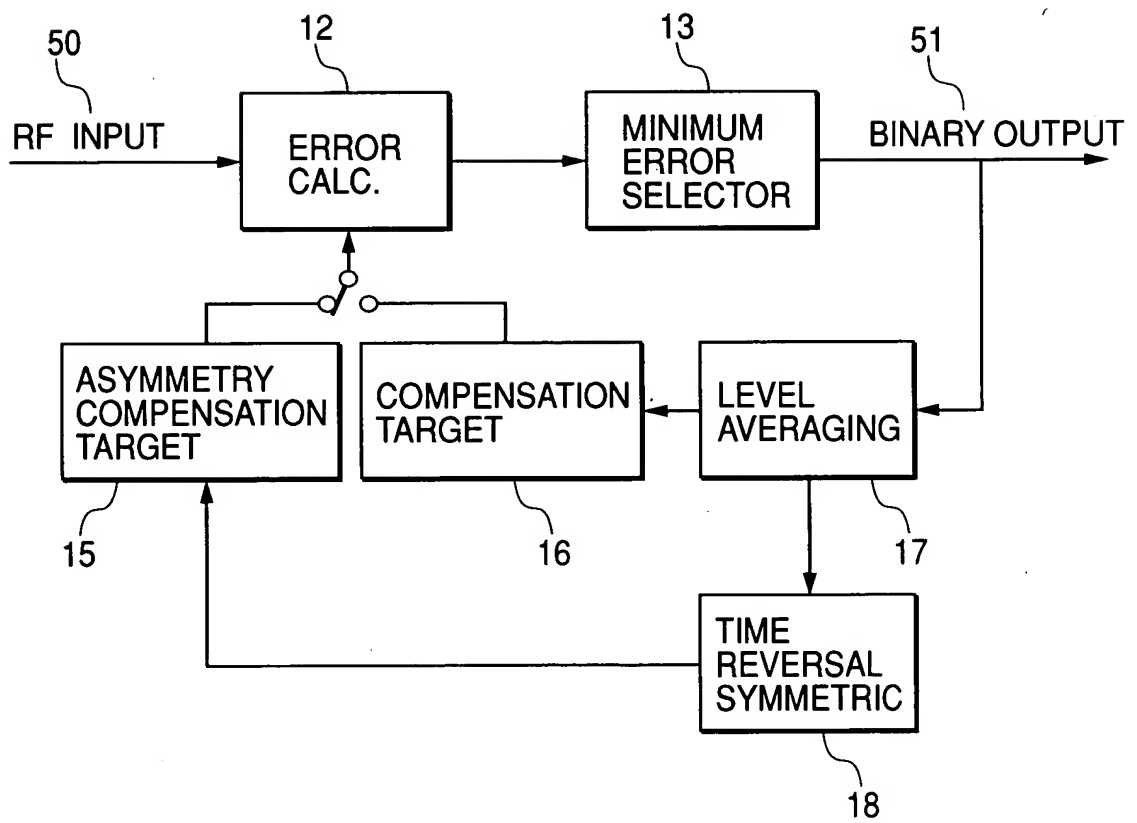
(*) PR TARGET LEVEL NORMALIZATION
 TARGET LEVELS ARE NORMALIZED FOR ± 1
 (TARGET LEVEL OF (0000) AND (1111) ARE ± 1)

(**) LEVEL DEFINITIONS
 $\Delta 4 = (\Delta(0000) + \Delta(1111))/2$
 $\Delta 3 = (\Delta(0001) + \Delta(1000)$
 $\quad + \Delta(1110) + \Delta(0111))/4$
 $\Delta 2 = (\Delta(1001) + \Delta(0110))/2$
 $\Delta E = (\Delta(0011) + \Delta(1100))/2$

WHERE,

$\Delta 4$ CAN BE MEASURED BY ENVELOPE DETECTION CIRCUIT,
 OR CAN BE CALCULATED FROM α (SIGNAL ASYMMETRY IN %)
 AND β (β VALUE IN %)

FIG. 11



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FIG. 12A

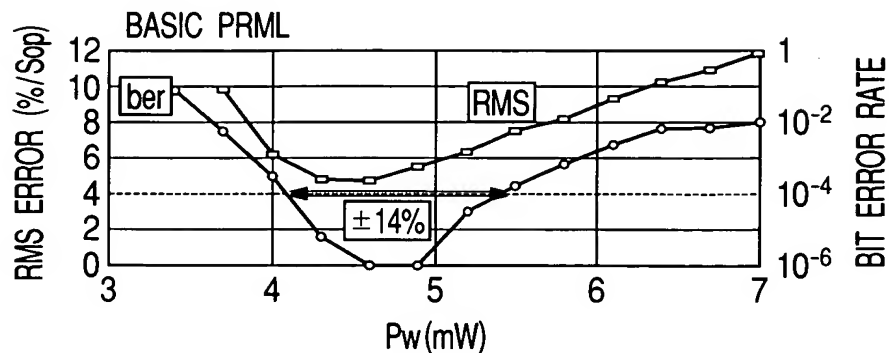


FIG. 12B

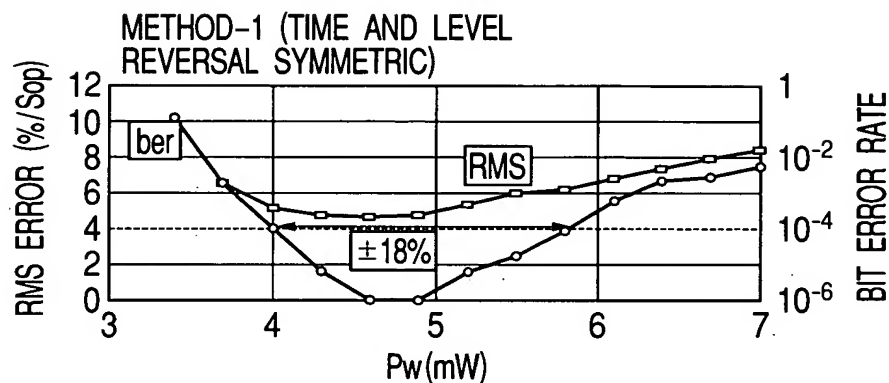


FIG. 12C

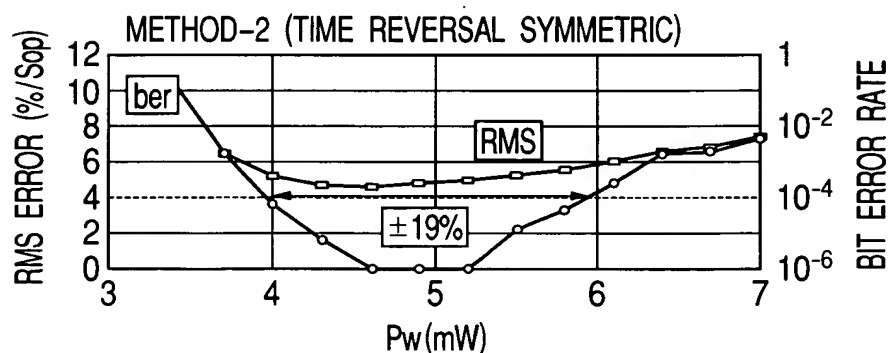
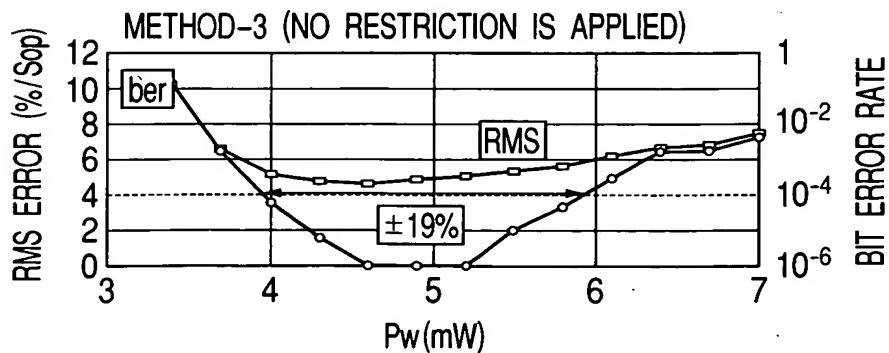


FIG. 12D



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FIG. 13A

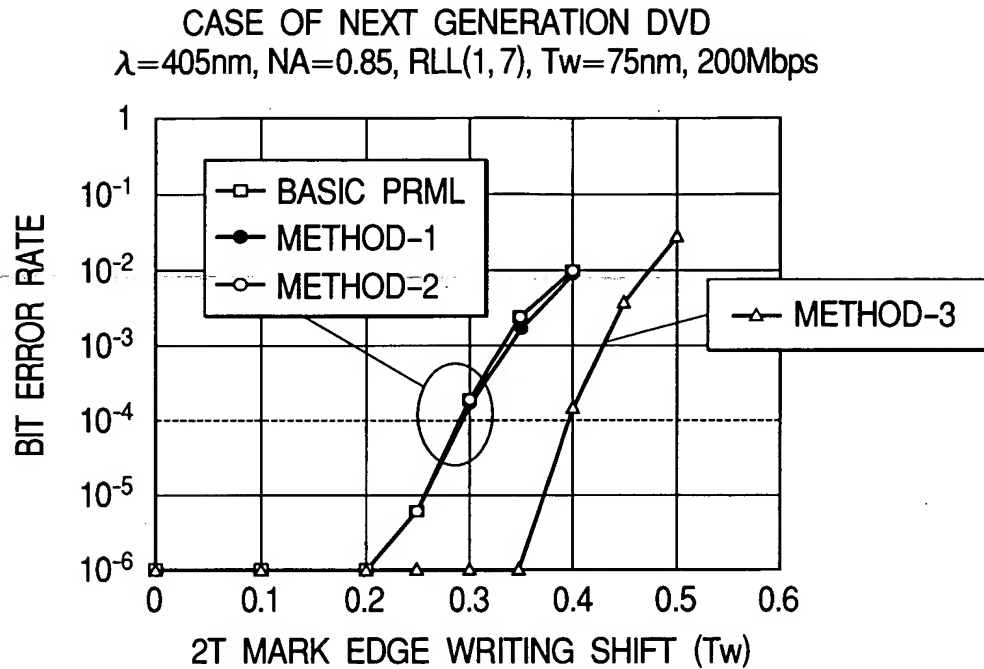


FIG. 13B

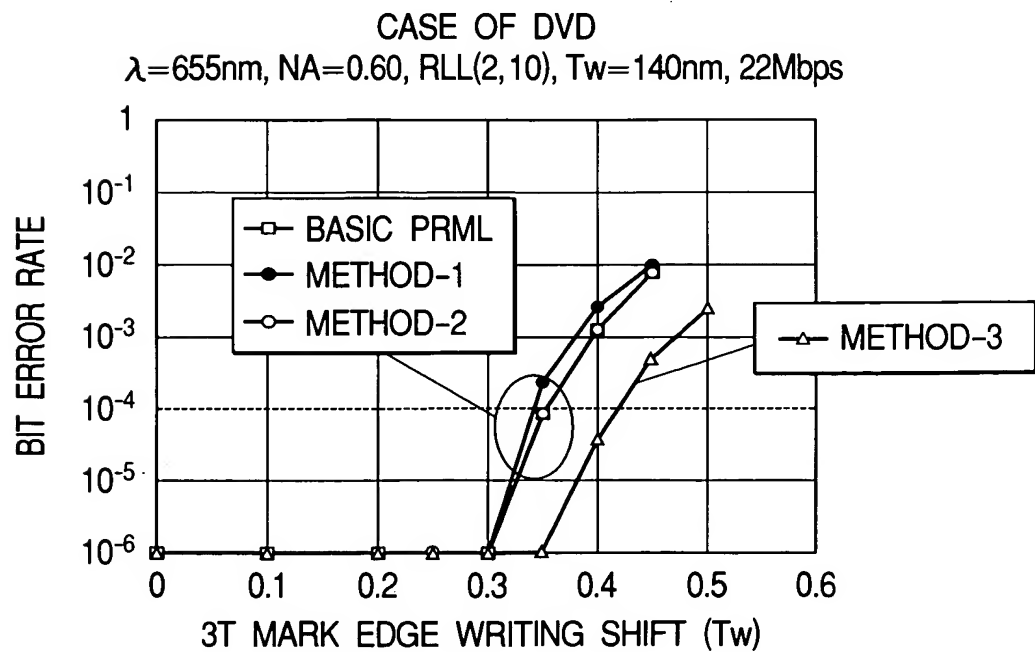


FIG. 14

CONTENTS	BASIC PRML	ADAPTIVE PRML	OUR INVENTION
TARGET LEVELS	FIXED	ADAPTIVE TO READOUT SIGNAL	ADAPTIVE TO ASYMMETRY
ASYMMETRY COMPENSATION	×	○	○
WRITE CONDITION ADJUSTMENT	×	△	○
MEDIA INTERCHANGEABILITY	△	×	○

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FIG. 15A

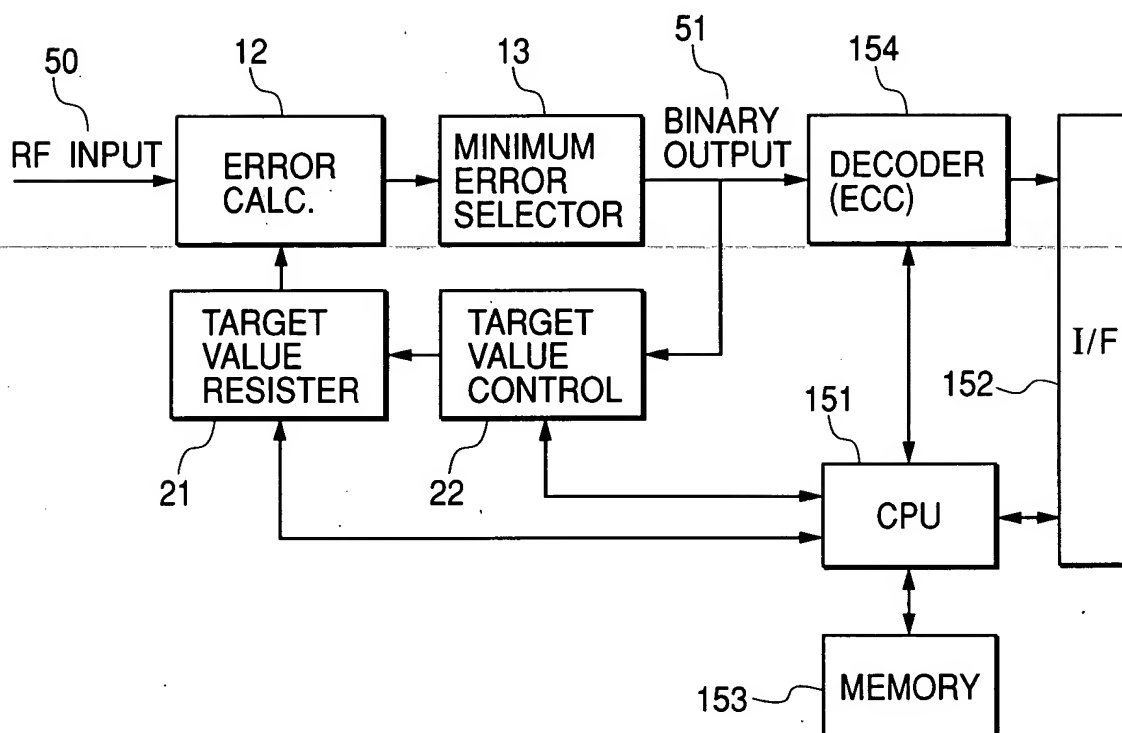


FIG. 15B

MODE	ASYMMETRY COMPENSATION TARGET	COMPENSATION TARGET (NO RESTRICTION)
ADJUST BEFORE SHIPMENT	○	×
FIELD STUDY	○	×
VERIFY	○	×
READ	○	○
READ RETRY	×	○

FIG. 16

